

towards the negative pole. But if a plate of iron, zinc, or copper, be substituted for the platina, then the oxygen and acid can combine with these, and the metal immediately begins to travel (as an oxide) to the opposite pole, and is finally deposited there. Or if, retaining the platina pole, a fused chloride, as of lead, zinc, silver, etc., be substituted for the sulphuric acid, then, as the platina finds an element it can combine with, it enters into union, acts as other elements do in cases of voltaic decomposition, is rapidly transferred across the melted matter, and expelled at the negative pole.

282. I can see but little reason in the theories referring the electro-chemical decomposition to the attractions and repulsions of the poles, and I can perceive none in M. de la Rive's theory, why the metal of the positive pole should not be transferred across the intervening conductor, and deposited at the negative pole, even when it cannot act chemically upon the element of the fluid surrounding it. It cannot be referred to the attraction of cohesion preventing such an effect; for if the pole be made of the lightest spongy platina, the effect is the same. Or if gold precipitated by sulphate of iron be diffused through the solution, still accumulation of it at the negative pole will not take place; and yet in it the attraction of cohesion is almost perfectly overcome, the particles are so small as to remain for hours in suspension, and are perfectly free to move by the slightest impulse towards either pole; and *if in relation* by chemical affinity to any substance present, are powerfully determined to the negative pole.<sup>1</sup>

283. In support of these arguments, it may be observed that as yet no determination of a substance to a pole, or tendency to obey the electric current, has been observed (that I am aware of) in cases of mere mixture; *i.e.* a substance diffused through a fluid, but having no sensible chemical affinity with it, or with substances that may be evolved from it during the action, does not in any case seem to be affected by the electric current.

\* In making this experiment, care must be taken that no substance be present that can act chemically on the gold. Although I used the metal very carefully washed, and diffused through dilute sulphuric acid, yet in the first instance I obtained gold at the negative pole, and the effect was

roprated when the platina poles were changed. But on  
examining the  
clear liquor in the cell, after subsidence of the metallic  
gold, I found a little  
of that metal in solution, and a little chlorine was also  
present. I therefore  
well washed the gold which had thus been subjected to  
voltaic action,  
diffused it through other pure dilute sulphuric acid, and  
then found that  
on subjecting it to the action of the pile, not the slightest  
tendency to  
negative pole could be perceived.